

WHAT IS CLAIMED IS:

1 1. An electron beam duplication lithography apparatus comprising:  
2 a first substrate;  
3 a field emitter deposited on the first substrate in a predefined pattern;  
4 a second substrate positioned a distance from the first substrate;  
5 an electron beam resist layer deposited on the second substrate; and  
6 circuitry for establishing an electric field to thereby cause an emission of  
7 electron beams from the field emitter towards the electron beam resist layer in order  
8 to modify the electron beam resist layer in a pattern substantially identical to the  
9 predefined pattern.

1 2. The apparatus as recited in claim 1, further comprising a magnetic field lens  
2 positioned to focus the electron beams as they are emitted from the field emitter  
3 towards the electron beam resist layer.

1 3. The apparatus as recited in claim 1, further comprising an electric field lens  
2 positioned to focus the electron beams as they are emitted from the field emitter  
3 towards the electron beam resist layer.

- 1 4. The apparatus as recited in claim 1, wherein the establishing circuitry further  
2 comprises a conductive layer between the first substrate and the field emitter.
- 1 5. The apparatus as recited in claim 1, wherein the establishing circuitry further  
2 comprises a conductive layer between the second substrate and the electron beam  
3 resist layer.
- 1 6. The apparatus as recited in claim 1, further comprising a conductive or  
2 dielectric material deposited on the ~~first~~ substrate between portions of the patterned  
3 field emitter.
- 1 7. The apparatus as recited in claim 6, wherein the conductive or dielectric  
2 material covers edges of the field emitter.
- 1 8. The apparatus as recited in claim 6, wherein a surface of the conductive or  
2 dielectric material is coplanar with a emitting surface of the field emitter.
- 1 9. The apparatus as recited in claim 6, wherein an emitting surface of the field  
2 emitter is recessed below a surface of the conductive or dielectric material.

1        10.    A method for performing duplication lithography, comprising the steps of:  
2                providing a first substrate with a field emitter deposited on the first substrate  
3                in a predefined pattern;  
4                providing a second substrate positioned a distance from the first substrate with  
5                an electron beam resist layer deposited on the second substrate; and  
6                establishing an electric field to thereby cause an emission of electron beams  
7                from the field emitter towards the electron beam resist layer in order to modify the  
8                electron beam resist layer in a pattern substantially identical to the predefined pattern.

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1        11.    The method as recited in claim 10, further comprising positioning a magnetic  
2                field lens to focus the electron beams as they are emitted from the field emitter  
3                towards the electron beam resist layer.

1        12.    The method as recited in claim 10, further comprising positioning an electric  
2                field lens to focus the electron beams as they are emitted from the field emitter  
3                towards the electron beam resist layer.

1        13.    The method as recited in claim 10, wherein a conductive layer is positioned  
2                between the first substrate and the field emitter.

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1        14. The method as recited in claim 10, wherein a conductive layer is positioned  
2        between the second substrate and the electron beam resist layer.